New York State Next Generation Mathematics Learning Standards Unpacking Document (DRAFT)

GRADE: 5	DOMAIN: Numbers and Operations in Base Ten

CLUSTER: Understand the place value system.

Students' understanding of the patterns in the base ten system are extended from work with place value of multi-digit whole numbers and decimals to the thousandths place. Students deepen their knowledge through a more generalized understanding of the relationships between adjacent places on the place value chart, e.g., 1 tenth times any digit on the place value chart moves it one place value to the right.

Grade Level Standard:

NY-5.NBT.3 Read, write, and compare decimals to thousandths.
NY-5.NBT.3a Read and write decimals to thousandths using base-ten numerals, number names, and expanded form.
NY-5.NBT.3b Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

PERFORMANCE/KNOWLEDGE TARGETS
(measurable and observable)

- Read and write decimals to the thousandths place in word form, base-ten form, and expanded form.
- Compare two decimals to the thousandths, based on the meaning of the digits in each place.
- Use comparison symbols and know how to read them correctly.

ASPECTS OF RIGOR

Procedural Conceptual Application

MATHEMATICAL PRACTICES	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.
FOUNDATIONAL UNDERSTANDING	**NY-4.NBT.2a** Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. **NY-4.NBT. 2b** Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. **NY-4.NBT.3** Use place value understanding to round multi-digit whole numbers to any place. **NY-4.NF.5** Express a fraction with denominator 10 as an equivalent fraction with denominator 100 and use this technique to add two fractions with respective denominators 10 and 100. **NY-4.NF.6** Use decimal notation for fractions with denominators 10 or 100. **NY-4.NF. 7** Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify conclusions. **NY-5.NBT.1** Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/ 10 of what it represents in the place to its left.

DRAFT

The following pages contain EXAMPLES to support current instruction of the content standard and may be used at the discretion of the teacher and adapted to best serve the needs of the learners in the classroom.

Students should build on their work from grade 4 where they worked with decimals and fractions. The use of concrete models and number lines help extend their understanding of decimals to the thousandths place. Models can include place value charts, drawings, or base ten blocks.
Students name decimals in standard form, unit form, expanded form, and word form.
Decimals can be written in several ways.
Standard Form: 7.534
Unit Form: 7 ones, 5 tenths, 3 hundredths, 4 thousandths
Expanded Form: 7+ 0.5 + 0.03 + 0.004
$(7x1) + (5 \times \frac{1}{10}) + (3 \times \frac{1}{100}) + (4 \times \frac{1}{1000})$
(7x1) + (5 x 0.1) + (3 x 0.01) + (4 x 0.001)
Word Form: Seven and five hundred thirty-four thousandths. The decimal point is always read as AND.

Students read decimals using the language of fractions. The following is taken from EngageNY Grade 5 Module 1, Lesson 5.

T: Imagine 3 copies of 1 thousandth. How many thousandths is that?
S: 3 thousandths.
T: (Write in standard form and as a fraction.)
T: 3 thousandths is 3 copies of 1 thousandth.

Three thousandths = $0.003 = \frac{3}{1000}$

$\frac{3}{1000} = 3 \times \left(\frac{1}{1000}\right)$

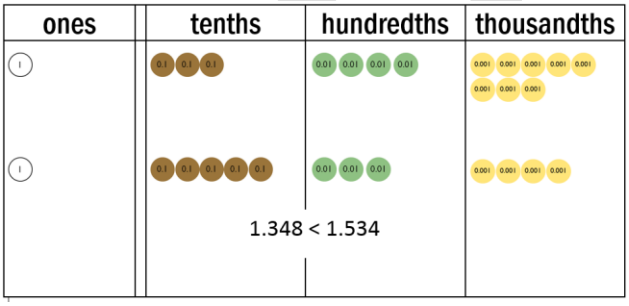
$0.003 = 3 \times 0.001$

3 thousandths

Standard form shows us the digits that we are using to represent a number. Expanded form shows how much each digit of the number is worth and that the number is a total of those values added together. Expanded form reinforces place value understanding by showing how many of each size unit there are in a number.

Further, students reason about differences in the values of like place value units and express those comparisons with symbols (>, <, and =). Place value charts and disks offer a beginning for comparing decimal fractions to the thousandths.
When comparing decimals to the thousandths place, look to the greatest place value first.

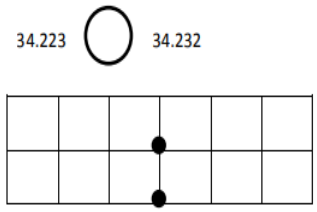
Example 1: Using Place Value Chart and Disks



The following pages contain EXAMPLES to support current instruction of the content standard and may be used at the discretion of the teacher and adapted to best serve the needs of the learners in the classroom.

Example 2: Compare Decimal Fractions to the Thousandths using Like Units
The following is taken from EngageNY Grade 5 Module 1, Lesson 6.

- Show the numbers on the place value chart using digits. Use >, <, and =



34.223 is the same as 34,223 thousandths.
34.232 is the same as 34,232 thousandths.
34,223 thousandths is less than 34,232 thousandths.
Therefore, 34.223 is less than 34.232.

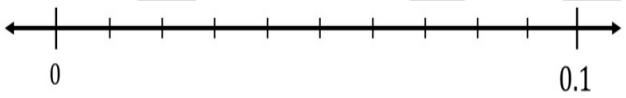
Help students deepen their understanding of comparing decimals by returning to concrete materials. For example, some students may not see that 0.4 > 0.399 because they are focusing on the number of digits to the right of the decimal rather than their value. Comparison of like units becomes a concrete experience when students' attention is directed to comparisons of largest to smallest place value on the chart.

- Another example to consider, when comparing 0.54 and 0.549, students can rename 0.54 as 0.540 and see that 0.540 is less than 0.549. Students can apply similar reasoning to the problem below:

  Lance measured 0.485 liter of water. Angel measured 0.5 liter of water. Lance said, "My beaker has more water than yours because my number has three decimal places and yours only has one." Is Lance correct? Use words and numbers to explain your answer.

Example 3: Placing Thousandths on the Number Line
The following is taken from Illustrative Mathematics, content licensed under CC BY-NC-SA 4.0.

- Label all the tick marks on the number line.



Plot and label each of the following numbers on the number line.
0.100
0.010
0.072
0.038
Which of these numbers is greatest? Which is least? How can you tell by looking at the number line?

Example 4: Constructing viable arguments

- Students can work with a partner to discuss which is greater, 0.025 or 0.052? Explain. Draw a picture to illustrate your explanation.
- Write two decimals that are in between 0.3 and 0.524. Show how you know.
- What is similar and what is different between the two numbers 8.26 and 8.026?